



SPRING
2021
VIRTUAL

Impact Investing

(Joint with Brad Barber and Adair Morse)
Journal of Financial Economics, January 2021

Ayako Yasuda
University of California, Davis
April 12, 2021

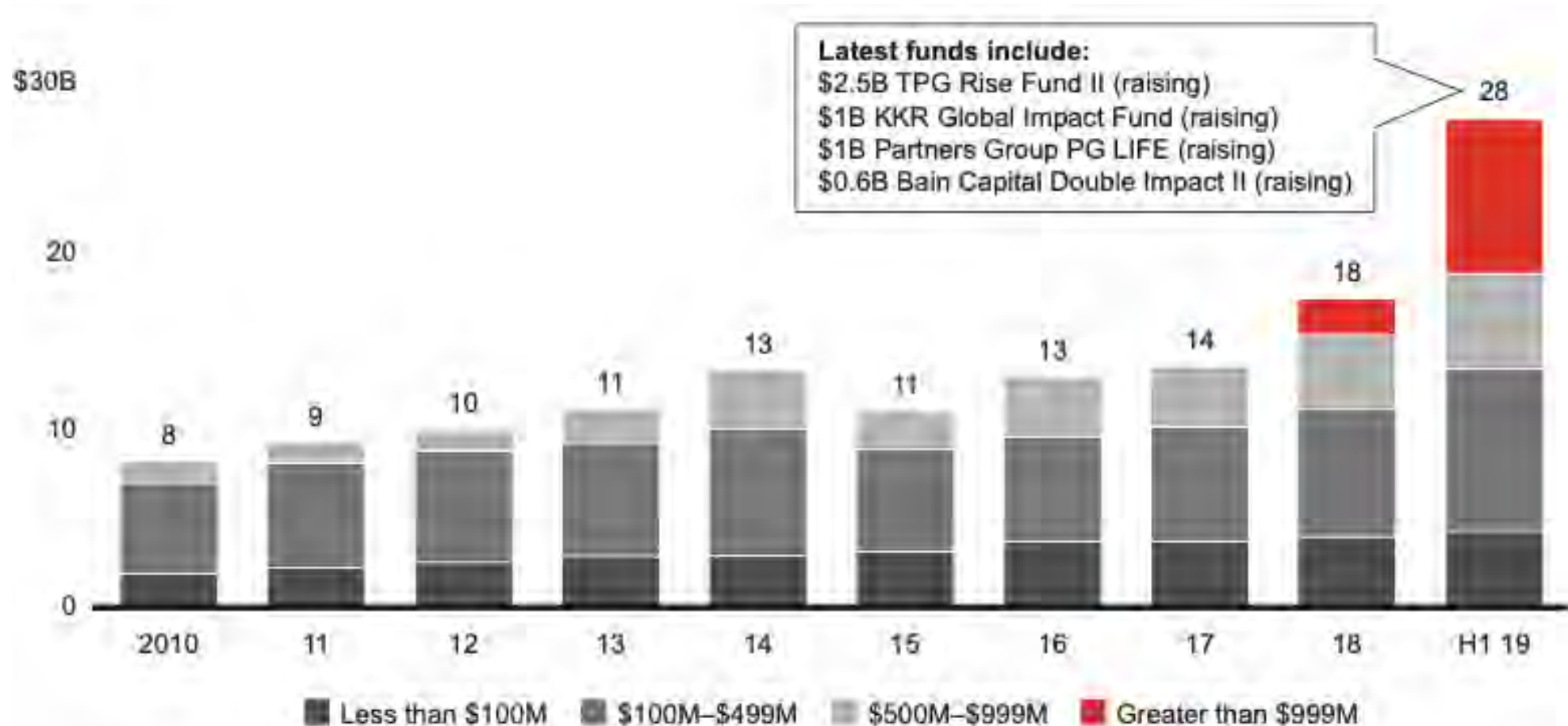
Our Question

Do private capital investors have utility functions that value impact generation as well as financial returns?

- Study: Impact Investments \equiv VC funds with **explicit dual objectives** to generate positive externalities + financial returns
- Document:
 - 1) Realized performance of Traditional VC versus Impact VC
 - 2) Discrete choice model to infer willingness to pay for impact
 - 3) By which types of investors

Impact Investing in PE/VC Space

Total AUM of Dedicated Impact PE/VC Funds



Bain (2020).

Impact Investors in Theory Models

- Pedersen Fitzgibbons Pomorski (forthcoming JFE): 3 investor types to derive ESG-efficiency frontier
 1. **ESG-unaware**: maximizes LP wealth only (traditional PE)
 2. **ESG-aware**, while having mean-variance preference
 3. **Pro-ESG**, has ESG in utility function. GPs can rationally maximize shareholder welfare for such LPs.
- Pastor Stambaugh Taylor (forthcoming JFE)
 - **Pro-ESG investors'** willingness to forgo return in exchange for investing in green-tilted portfolio lower green firm's cost of capital

Materiality vs. Impact

Materiality-focused ESG

Investment strategy that incorporates ESG factors that could impact a company's financial performance.

The focus is **sustainability of the company**.

Single objective (**ESG-aware**)

Material factors vary by industry.
SASB (Sustainability Accounting Standards Board) Materiality Map

Impact Investing

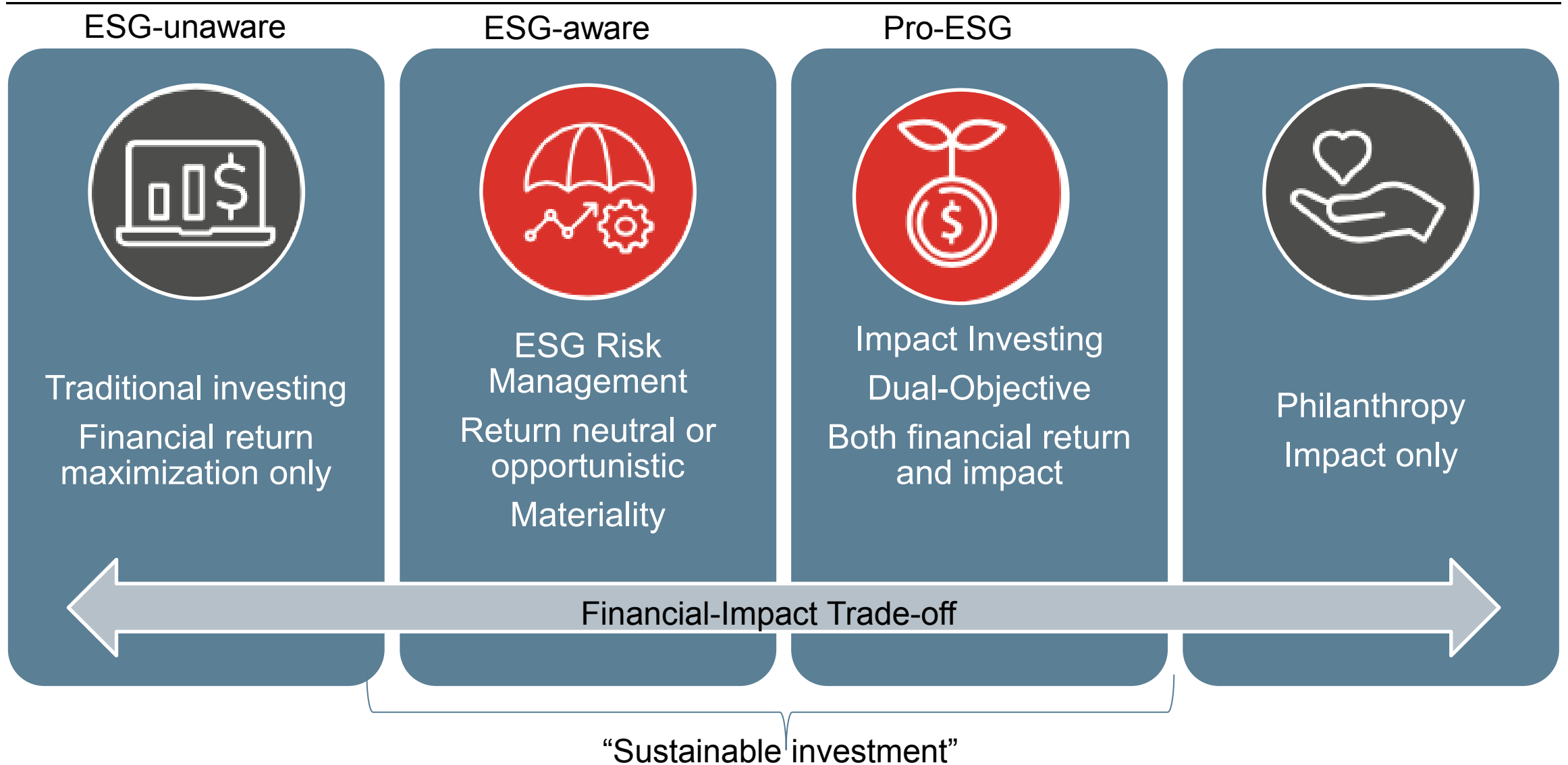
Investments made with the **intention** to generate positive, measurable social and environmental impact alongside a financial return.

The focus is **sustainability of the broader society and the environment**.

Dual-objective (**Pro-ESG**)

Impact metrics vary by impact sector.
GIIN (Global Impact Investing Network)

A Continuum



Do Pro-ESG Investors Behave as Predicted by Theory? Yes.

1. Practitioners promote “doing well by doing good” as the reason for doing ESG
 - This assumes investors are unwilling to sacrifice financial returns
 - U.S. pensions are bound by fiduciary duty that prohibits them from considering ESG factors if financial returns are sacrificed
2. Cynics dismiss impact investing as cosmetic greenwashing or re-branding

Our paper rebuts the cynic “re-branding” view of impact investing

- LPs accept 2.5-3.7% lower expected IRR (“willingness to pay”) for impact funds compared to traditional VC funds.
- Development organizations, foundations, financial institutions, public pensions, Europeans, and UN PRI signatories have high willingness to pay (WTP).
- Investors bound by U.S.-style fiduciary duty have low WTP.

Impact investors value ESG outcomes & are willing to trade off financial returns
U.S.-style fiduciary duty may constrain some pro-ESG investors' welfare maximization

Data: Designating VC Funds as Impact or Traditional

1. Start with Preqin data of ~4700 VC & growth equity funds 1995-2014
2. Identify potential impact funds by taking union of 7 impact funds datasets:
 - Text-based article search,
 - ImpactBase
 - ImpactAssets: “Impact 50”
 - Cambridge Associates – MRI manager list
 - Preqin Ethos
 - Preqin funds in poverty geographies800+ funds (too many false positives)
3. Manually verify Impact Fund status (reading for dual agenda)
 - 159 Impact Funds
 - 823 Capital Commitments

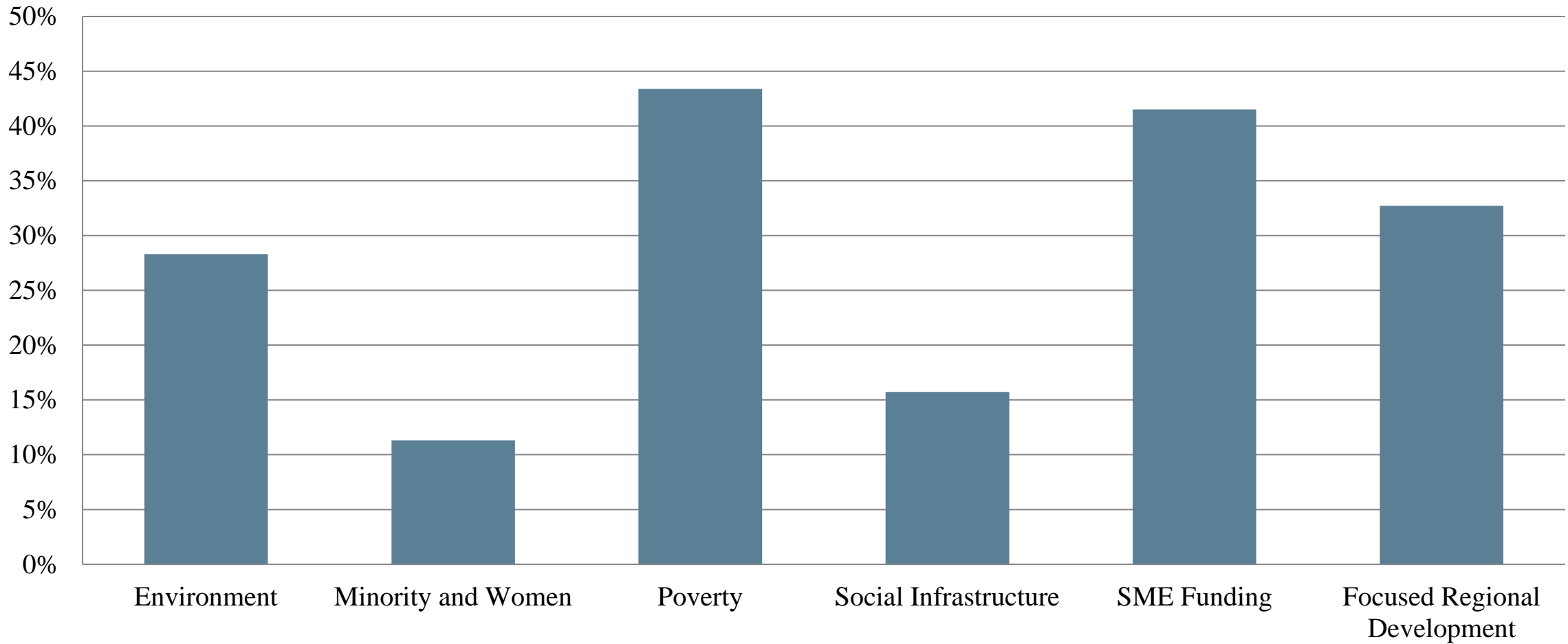
Fund Descriptive Statistics:

Preqin Data Covering 3,500 LP investors from 1995-2014

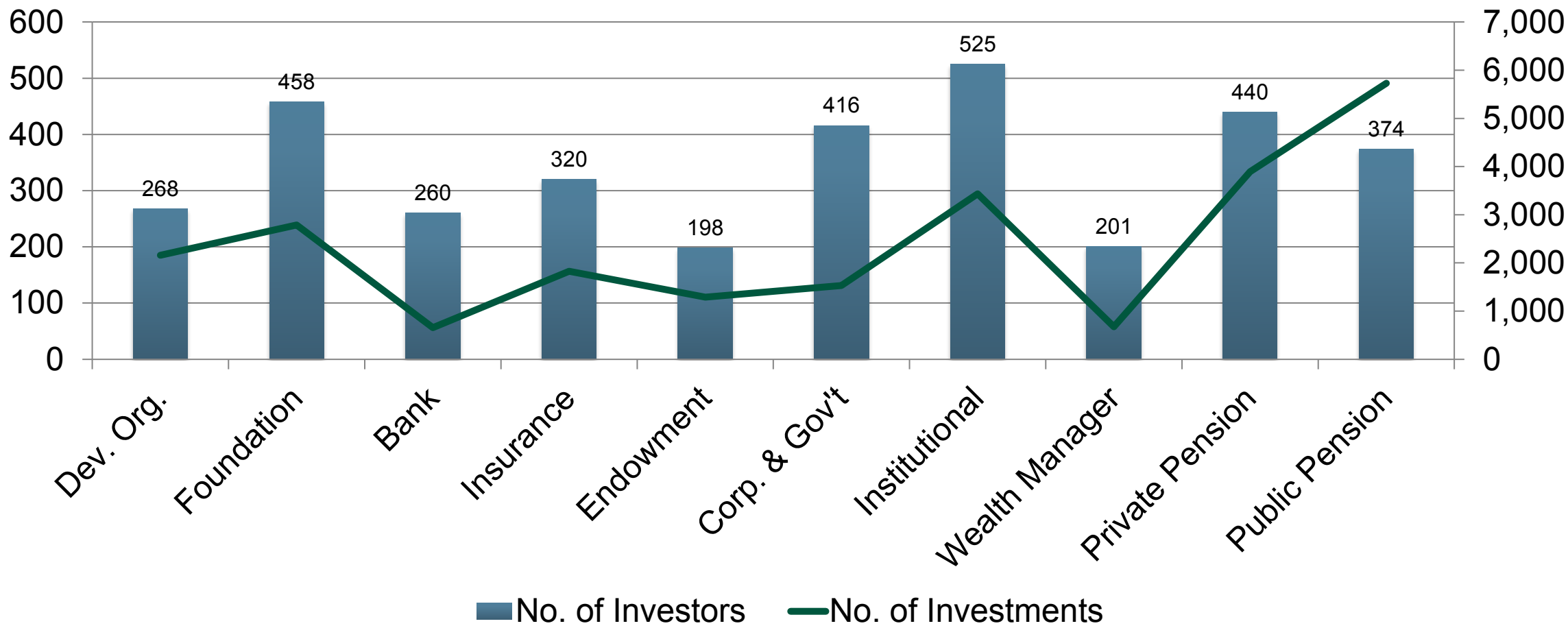
	Traditional VC Funds				Impact Funds			
	N	Mean	Median	Std. Dev.	N	Mean	Median	Std. Dev.
Vintage Year	4500	2005.4	2006.0	5.26	159	2006.7	2008.0	4.44
Fund Size (\$mil)	4000	204.6	102.0	300.2	147	129.6	83.0	147.3
Capital Commit (\$mil)	2717	22.2	14.6	33.8	125	27.1	15.0	32.9
IRR (%)	1207	11.6	7.4	32.1	76	3.7	6.35	15.2
VM - Value Multiple	1484	1.51	1.22	1.94	91	1.17	1.10	0.56
Percentile Rank	1528	0.49	0.50	0.30	93	0.34	0.28	0.30
Fund Sequence Number	4500	3.95	2.00	5.63	159	3.88	2.00	5.91

Impact Categories:

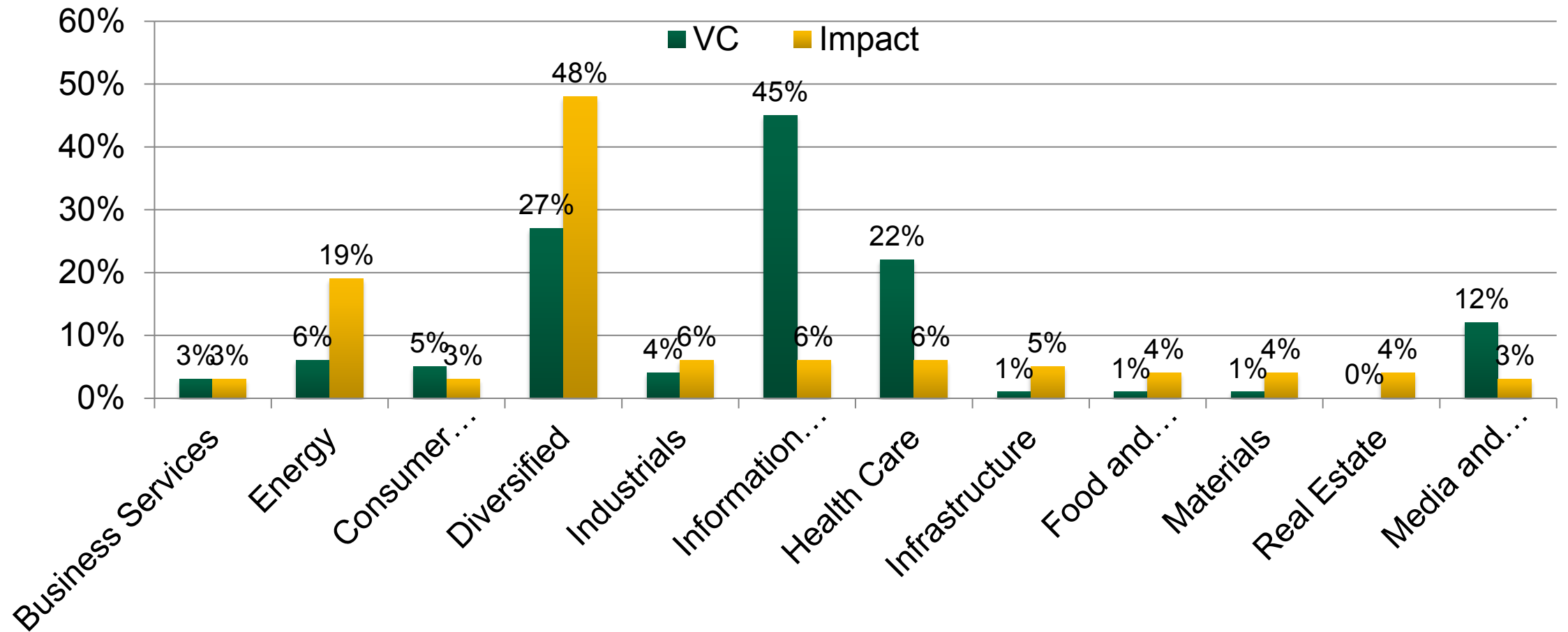
% of Funds with Attribute (multiple entries allowed)



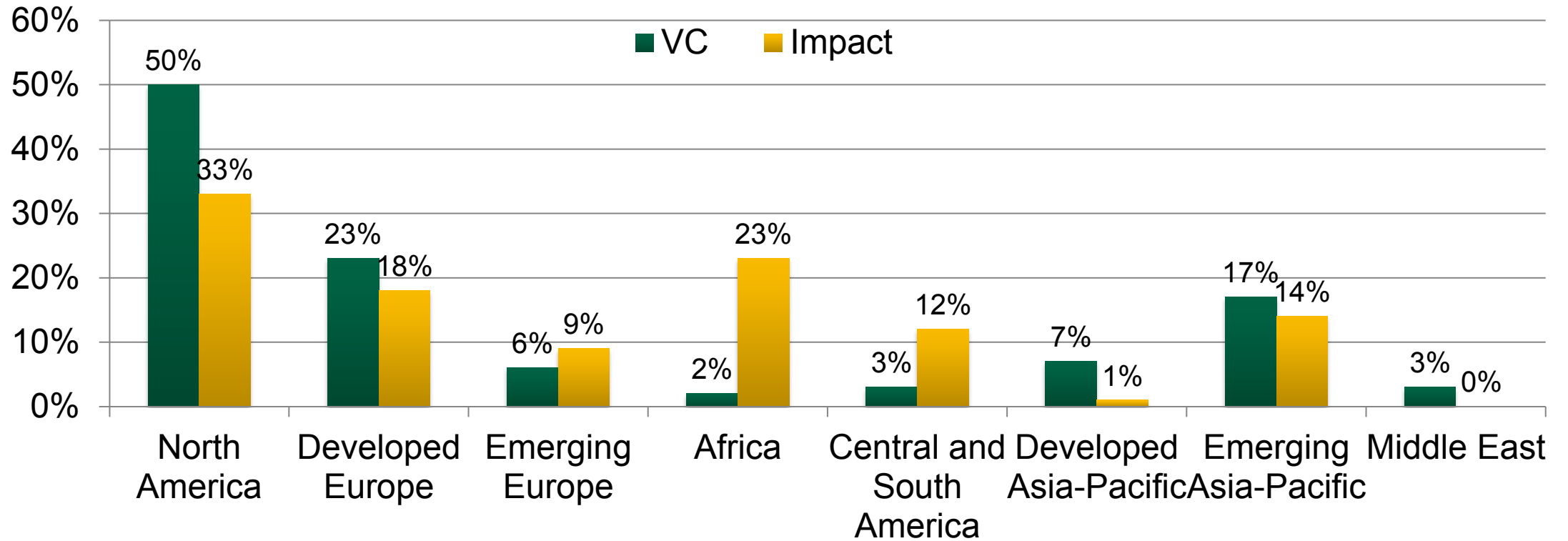
Number of Investors (Investments) by Limited Partner (LP) Investor Type



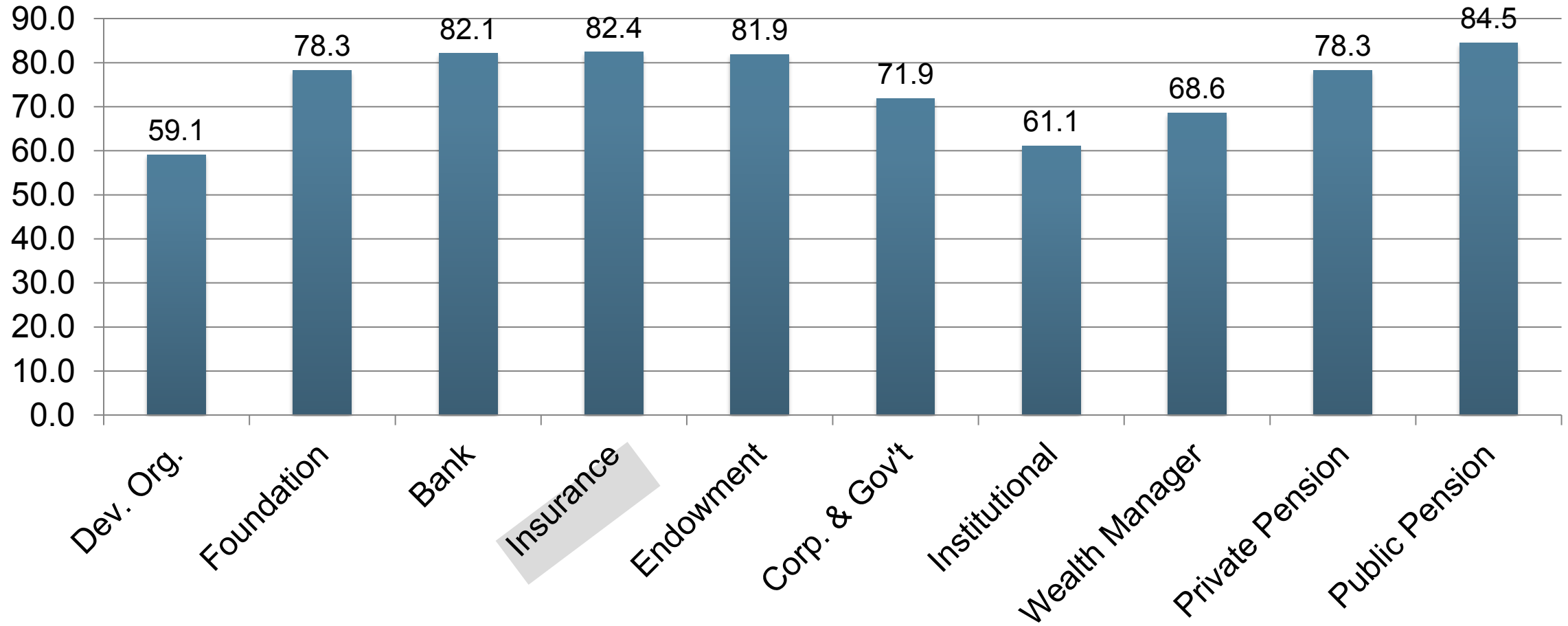
Impact vs. Traditional VC by Industry



Impact vs. Traditional VC by Region



% of Investments with Home Bias by Investor (LP) Type



Realized Performance

$$IRR_j = a + bIMP_j + XG + e_j$$

Three performance measures (final or last reported):

1. Internal Rate of Return
2. Value Multiple
3. Percentile Rank in Cohort (Vintage Year/Region)

Three regression specifications:

1. Univariate with Impact Dummy
2. (1) + Vintage year fixed effects + fund covariates
3. (2) + Industry and Geography fixed effects

Robust standard errors, clustered by vintage year

Realized Performance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	IRR	IRR	IRR	VM	VM	VM	Rank	Rank	Rank
Impact	-7.89**	-9.94***	-4.73*	-0.4***	-0.46***	-0.36**	-0.15***	-0.16***	-0.08**
	[3.705]	[2.638]	[2.616]	[0.124]	[0.129]	[0.164]	[0.032]	[0.033]	[0.036]
N - Impact Funds	76	76	76	91	91	91	93	93	93
Observations	1,283	1,252	1,252	1,575	1,518	1,518	1,621	1,563	1,563
R-squared	0.004	0.146	0.166	0.002	0.123	0.131	0.013	0.027	0.068
Controls:									
Vintage Year FE	NO	YES	YES	NO	YES	YES	NO	YES	YES
Log(Fund Size)	NO	YES	YES	NO	YES	YES	NO	YES	YES
Log(Sequence)	NO	YES	YES	NO	YES	YES	NO	YES	YES
Fund Geo. FE	NO	NO	YES	NO	NO	YES	NO	NO	YES
Fund IndustryFE	NO	NO	YES	NO	NO	YES	NO	NO	YES

Note: Estimation in the Geo F.E. + Industry F.E. become very sparse in impact funds. Showing for robustness, but magnitude likely attenuated significantly.

Who has a Willingness-to-pay? Methodology

Idea: Investors have utility over impact and financial returns

- Hedonic pricing = methods to price attributes providing utility
 - Court (1939), Griliches (1961), Rosen (1974), McFadden (1986)
- Cameron/James (1987): Willingness to pay from discrete choice.

$$U^*_{ij} = \mu_i + \beta \mathbb{E}[r_j] + \delta_i \text{IMP}_j + \Gamma' X_{ij} + \varepsilon_{ij}$$

- U^*_{ij} : random utility of investor i from investing in fund j
- $\mathbb{E}[r_j]$: expected return for fund j
- IMP_j : dummy = 1 if fund j is impact fund
- X_{ij} : other factors (prior relationship, size, geo, industry, home bias)

$$U_{ij}=1 \text{ iff } U^*_{ij}>0$$

$$\text{Logit}(U_{ij}) = \mu_i + \beta \mathbb{E}[r_j] + \delta_i \text{IMP}_j + \Gamma' X_{ij} + \varepsilon_{ij}$$

$$wtp_imp_i = \frac{\left(\frac{\partial u}{\partial \text{IMP}_j}\right)_i}{\frac{\partial u}{\partial \mathbb{E}[r_j]}} = \frac{\partial \mathbb{E}[r_j]}{\partial \text{IMP}_j} = \frac{\delta_i}{\beta}$$

Expected Returns

- Methodology requires a measure of ER by fund with Information Set available to investors at that time
 - Kaplan/Schoar and Korteweg/Sorensen provide frameworks, based on persistence of performance within a VC fund family.

$$R_j = aR_j^{-1} + bMiss_j^{-1} + cFirst_j + dIMP_j + eIMP_j * Miss_j^{-1} + fIMP_j * First_j + \varepsilon_j$$

- Implement rolling by year out of sample
- Jorion(1986) : Out-of-sample forecasts of expected returns generate more dispersion in expected returns than investors would rationally expect ex-ante.
 - Thus, investors would rationally shrink the extreme forecasts toward a global mean expected return.
- We follow shrinkage procedure of Fama and French (1997):
 - Regressing realized fund returns on the forecast of returns and taking prediction

Baseline Results

	(1)	(2)
Panel A: Homogeneous Expected Returns Forecast		
Expected Returns	3.354*** [0.276]	3.426*** [0.210]
Impact	0.591*** [0.0599]	0.585*** [0.0443]
WTP Estimate	0.176	0.171
Pseudo R-Squared	0.261	0.237
Observations	3,047,430	3,047,430
Panel B: Heterogeneous Expected Returns Forecast		
Expected Returns	4.655*** [0.225]	4.725*** [0.140]
Impact	0.613*** [0.0577]	0.602*** [0.0422]
WTP Estimate	0.132	0.127
Pseudo R-Squared	0.263	0.246
Observations	3,047,430	3,047,430
Model:		
Logit with Dynamic LP Invest. Groups	Yes	--
Conditional Logit Model	--	Yes
# F.E. (LP or Dynamic LP Groups)	368	3,460

Dependent Variable: Investment 0/1 Decision

Sample: All Active LP Investors Looking at All VC Funds of that Vintage

These WTP calculations are in percentile ranks performance.

Moving 18 percentile ranks (e.g., from 41st to 59th percentile) implies WTP in IRR of 3.7%

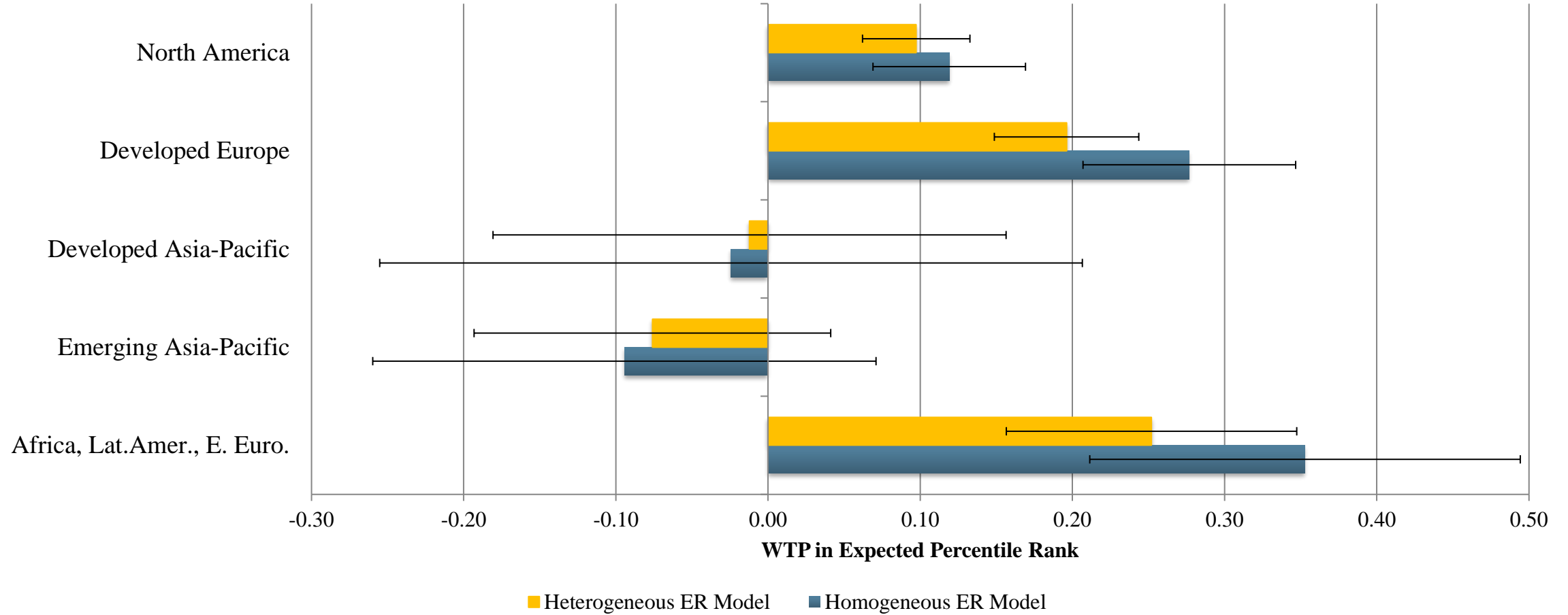
Range: 2.5-3.7% in IRR, or 0.13-0.17 in excess PME.

Next Steps

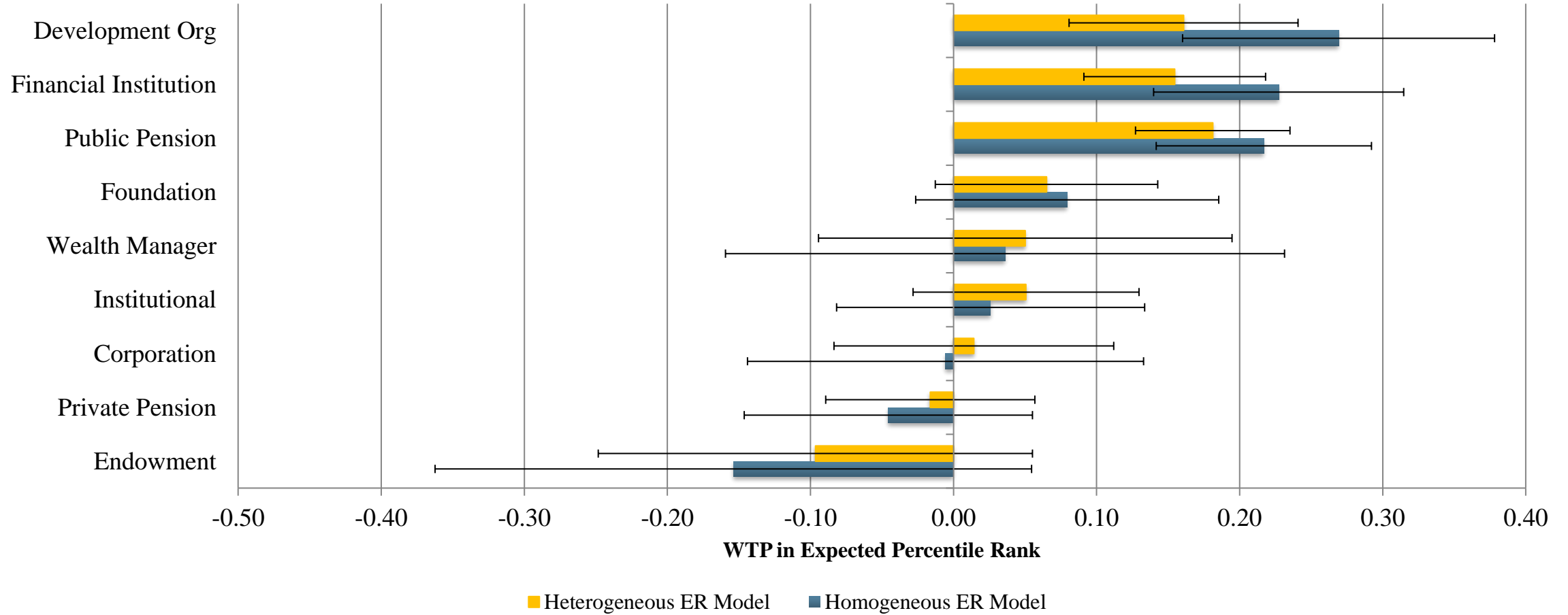
Our agenda is very much about understanding [WHO has a WTP.](#)

- **WTP by Region**
 - Prior Literature evidence suggests Europeans have higher WTP
- **WTP by LP Types**
 - Ie: Banks vs pensions vs development organizations
- **WTP by Attributes of these LP Types**

WTP by Region



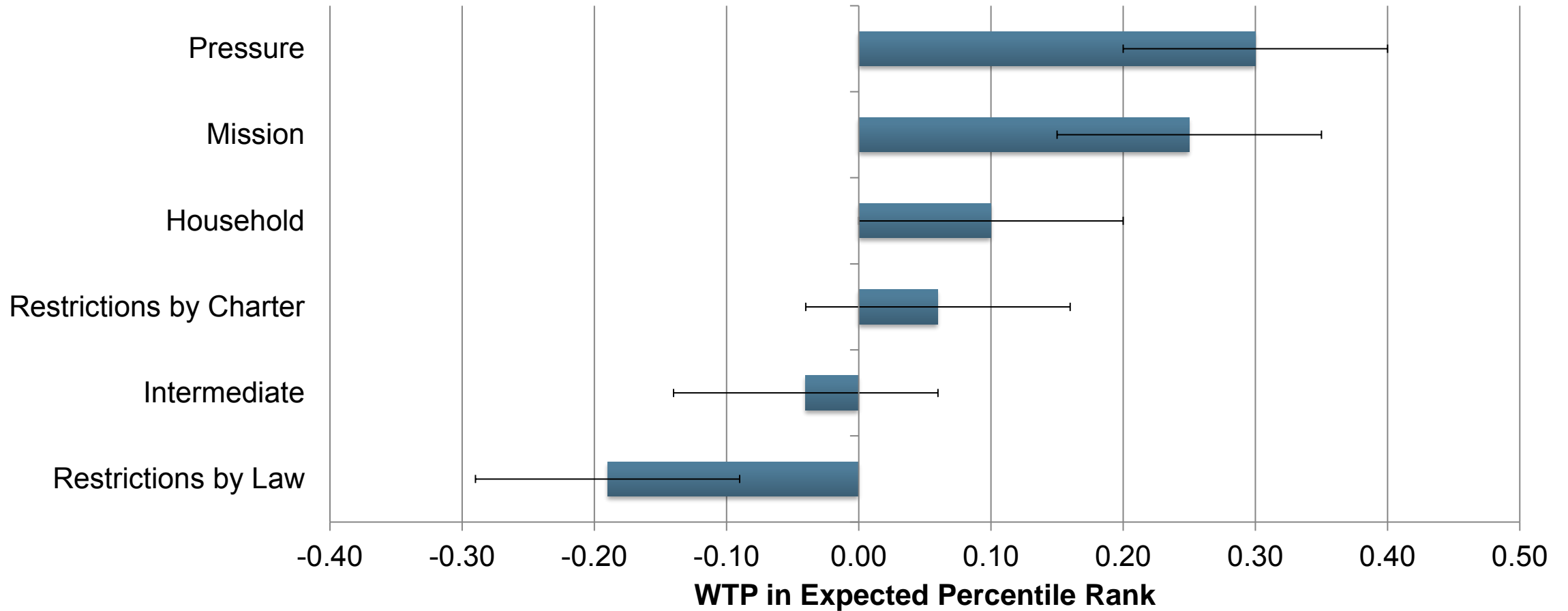
WTP by LP Type



What attributes explain the WTP for impact?

Limited Partner	Constituent	Intermediated	Mission	Pressures for Impact	Laws Restricting	Charter Restricting
Development Organizations	Org	--	yes	--	--	--
Foundations	Org	--	yes	--	UPMIFA and tax/PRI (U.S.)	--
Banks	Org	--	--	Community Reinvestment Act (U.S.)	--	yes
Insurance	Org	--	--	State regulation modeled after CRA (U.S.)	--	yes
Endowments	Org	--	--	--	UPMIFA (U.S.)	--
Corporate & Government Portfolios	Org	--	--	--	--	yes
Institutional Asset Managers	Org	yes	--	--	--	yes
Wealth Managers	Household	yes	--	--	--	--
Private Pensions	Household	--	--	--	ERISA (U.S.)	yes (non-US)
Public Pensions	Household	--	--	yes Political pressure	State & National Laws	--

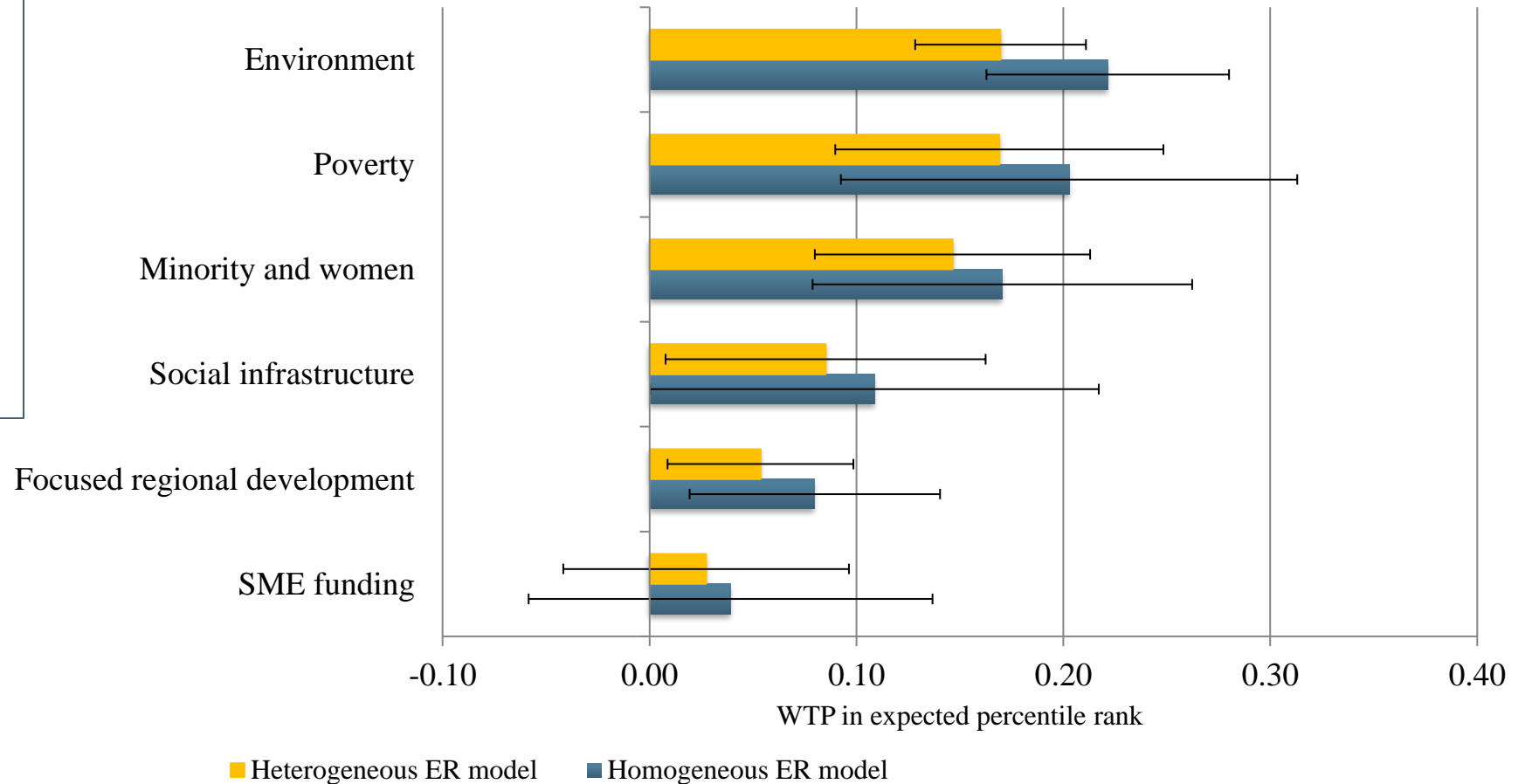
WTP by Investor Attribute



In addition, WTP is + for UNPRI signatories, especially in years after signing.

WTP by Impact Category

Investors are willing to forgo more returns when investing in categories with high public good or externality content.



Conclusion

Goal: Do social/environmental externalities enter investors' utility functions?

- Yes, Investors exhibit a **willingness to pay of 2.9-4.2%**

Which investors: Europeans, Development org, financial institutions, and public pensions

Why: Driving WTP: **Mission objective, Political and regulatory pressure**

Hindering WTP: **Legal restrictions** (e.g. ERISA, UPMIFA)

Some Thoughts & More Research:

1. Reading into “why”, regulators matter a lot!
 - We could quantify their aggregate influence in terms of capital tilted away from/toward impact.
 - What is the optimal (whose optimal?) level of regulator tilt as social planner?
2. Supply & demand curves:
 - If supply of or demand for investment opportunities increases, what is the clearing WTP?
3. Other markets: Is there WTP in public markets?

“Contract Costs, Stakeholder Capitalism, and ESG” Fama (2020)

“[U]nlike wealth, welfare has multiple dimensions (for example, E and S and G), and tastes for different dimensions vary across shareholders.... How do we write and enforce a payoff function in which managers are evaluated on wealth along with multiple dimensions of welfare, with the likelihood of randomness in outcomes on all dimensions? [This] puts us in the quagmire of satisfying the divergent tastes of shareholders ...a problem that implies high contract costs.”

- Contract cost problem is real but seems more solvable for PE than for public firms.
- Limited partnership agreement is a take-it-or-leave-it contract.
- GPs can offer a menu of contracts to meet divergent preferences of different LPs.
- LPs can opt in or out. Number of LPs is finite and manageable. Once committed, they are locked in and secondary sales of fund interests can be restricted.
- Plausible that PE is more compatible with stakeholder capitalism than public corporations.

